City of Helena

Emergency Action Plan For Scott Dam

CITY of HELENA
Ten Mile Water Plant
Public Works Department
316 North Park Avenue
Helena, MT 59623

IF SCOTT DAM FAILURE SEEMS IMMINENT, CALL

Lewis & Clark County Sheriff's Department 911

Helena Police Department 911

Disaster & Emergency Services 447-8285

Helena Public Works Director City of Helena 447-8428

CONTENTS

I. INTRODUCTION

1. **Purpose**. The purpose of this emergency action plan (EAP) is primarily to safeguard the lives and secondarily to reduce property damage of the citizens of Lewis and Clark County, living along Ruby Creek and Ten Mile Creek in the event of flooding caused by a failure of Scott Dam.

2. **Description of Dam**. Scott dam is in Lewis and Clark County, Section 2, Township 8N, Range 5W and located on Ruby Creek, tributary to Ten Mile Creek. It is owned by the City of Helena, 316 North Park, Helena, Montana 59623, and is used for municipal water supply. Technical data pertaining to Scott Dam and spillway is listed in Appendix C and its structures are shown in Appendix D.

3. **Access to Dam**. Scott Dam and spillway is located in the Helena National Forest, 16 miles southwest of Helena. As shown on the inundation map in Appendix B, one road accesses the Scott Dam from Helena via Gould Diggins Rd, and normally requires one hour to one hour and twenty minutes of driving from Helena. Snow and ice often restrict vehicular access to the dam from December until May. Normal site visits during this period are made by snowmobile.

4. **Communication to Dam**. Communications between the Helena Public Works Director and Ten Mile operator will normally be by mobile radio. Radios in the public works office, the City/County Support Services Division and the Ten Mile operator's vehicle will be manned on a 24-hour basis whenever a Pre-Emergency or Emergency condition is in effect at Scott Dam. In addition to the mobile radio, the Ten Mile operator's vehicle is equipped with a cell telephone, which can be used as a backup. During a situation when radio communications between the Public Works Office and project are lost, local residents will be called on for use of their telephone. The nearest phone is at 3474 Rimini Rd. in Rimini.

5. **Hazard Area**. The evacuation area extends from the dam along Ruby Creek and Ten Mile Creek to a point 22 miles downstream where the Ten Mile Creek passes under the I-15 bridge, as shown in Appendix B. Hazards include the possible inundation of 30 year-round residences on Rimini, 40 additional residences along Ten Mile Creek, residential portions of the Helena Valley and State Highway 12.

6. **Responsibility and Authority**. Pursuant to the Dam Safety Act, Chapter 15 of Title 85, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. Extent of owner implementation was defined through coordination of this plan with the county sheriff and disaster and emergency services coordinator.

7. **Periodic Review/Updating**. The owner will preview/update this EAP annually. Review/update by a professional engineer will be accomplished as required by the dam's operation permit, but no less than every five years.

8. **Approval**. By my signature, I acknowledge that I, or my representative, have reviewed this plan, and agree to the tasks and responsibilities assigned herein for my department and/or agency.

_____ ____/____/____
Signature Date
Lewis & Clark County Sheriff's Department

_____ ____/____/____
Signature Date
City of Helena Police Department

_____ ____/____/____
Signature Date
Disaster and Emergency Services

II. NOTIFICATION PROCEDURES

1. **Failure is Imminent or Has Occurred**. If Scott Dam is failing, or spillway exceeds 2100 CFS, two things must be undertaken immediately: (1) the hazard area downstream from the dam or spillway must be evacuated, and (2) any steps that might save the dam or reduce damage to the dam or hazard area should be taken. (Refer to the map in Appendix B to determine the areas that are likely to be inundated if the dam fails, or spillway exceeds 2100 CFS). The evacuation will be handled according to the county warning plan. Examples of conditions warranting declaration of an emergency condition include:

   a. Imminent or occurring spillway flow including: reservoir at elevation 101 and inflow greater than maximum discharge capacity (approximately 600 CFS at elevation 102) or reservoir level at elevation 99 (spillway crest) with forecast of significant precipitation and/or snowmelt to cause spillway flow.

   b. Major seepage problems including: large increases in piezometer readings, movement of large amounts of material in existing or new seeps, pipes in embankment or foundation materials, seepage at higher elevations on downstream face of dam or in abutment areas, and substantial increases in normal seepage amounts (especially when associated with movement of material from embankment or foundation).

   c. Major slope failure including: appreciable depressions or sloughs in the crest or slopes of the dam or bulges in the slopes or foundation, large gullies developing and continuing to erode in the embankment and abutments, displacement of structures or instrumentation on the dam and continuing

expansion of tension cracks after their appearance on the dam crest or slope.

d. Threats of sabotage or occurrence of sabotage to critical project features.

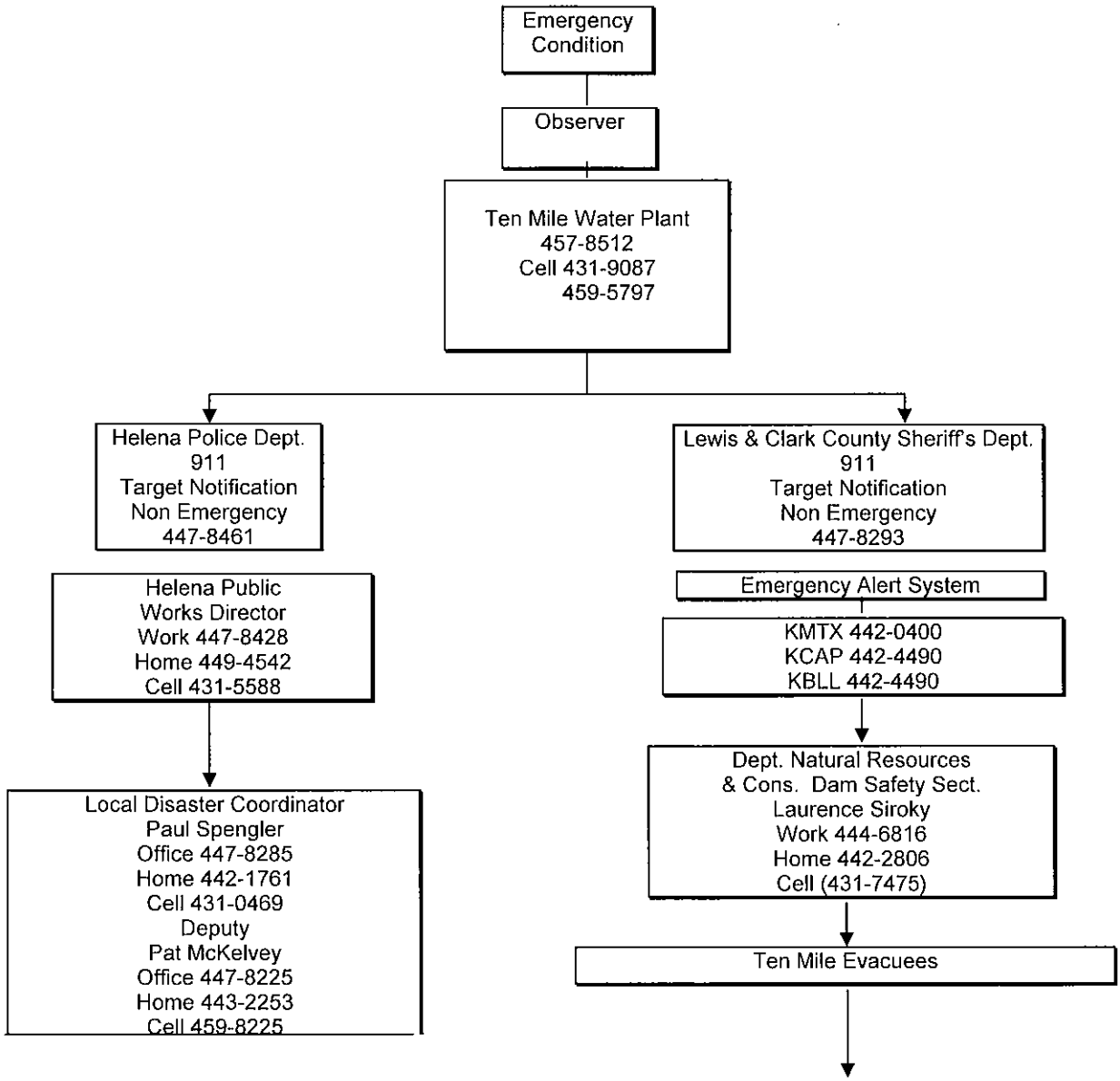
f. Major earthquake greater than VII on the Modified Mercalli Scale and within a 150-mile radius from the dam. (See Appendix F.)

g. Heavy rainstorms continuing for extended periods of time.

1. SCOTT DAM IMMINENT FAILURE

OR EXCESSIVE DISCHARGE

"NOTIFICATION FLOWCHART"



2. **WHAT THE DAM DIRECTOR/OPERATOR SHOULD DO**. As dam owner it is your responsibility to:

   a. Call the Police Dispatch Center or County Sheriff (911). Be sure to say, "This is an emergency". They will call other authorities and media and begin the evacuation.

   b. Do whatever is necessary to bring anyone in immediate danger to safety: people on the dam, directly below the dam, boating on the reservoir, and evacuees (if directed by the sheriff). Notify the occupants of Rimini (see Section 1, Flowchart) and Ten Mile Creek if possible without endangering your own life.

   c. Keep in frequent touch with Disaster and Emergency Services for resources and coordination with other agencies.

   d. If all means of communication are lost: (1) try to find out why, (2) try to get to another radio or telephone that works, or (3) get someone else to try to reestablish communications. If these means fail, handle the immediate problems as well as you can and periodically try to reestablish contact with Disaster and Emergency Services.

   e. It is important that you accurately judge whether the dam is about to fail or spillway overflow is excessive. If you aren't sure if the dam is threatened, seek advice from a qualified engineer or call the Department of Natural Resources and Conservation Dam Safety Section (444-6816).

3. **POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING**.

Hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Unusual occurrences that may affect the dam are: dam embankment problems, failure of the spillway or outlet works, heavy precipitation or rapid spring snowmelt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Examples of circumstances warranting declaration of a Pre-Emergency condition include:

a. Reservoir level at elevation 98 (spillway crest at elevation (99) or higher with either inflow exceeding outlet capacity or a forecast of significant inflows from precipitation and/or snowmelt.

b. Malfunction of operating gate system during flows operations, which impedes release of water and creates potential for spillway flow.

c. Minor seepage problems including: unexplained increases or decreases in amount, cloudy appearance of seepage or presence of fines, development of new seepage as indicated by soft boggy areas or new lush vegetation, and substantial unexplained fluctuation of piezometer readings.

d. Minor embankment failures including: tension cracks at crest or in slopes of embankment, small bulges in slopes or in foundation near toe of slope, small depressions or sags in crest or slopes, changes in horizontal crest alignment, and gullies forming in or near embankment or junction of the embankment and abutments.

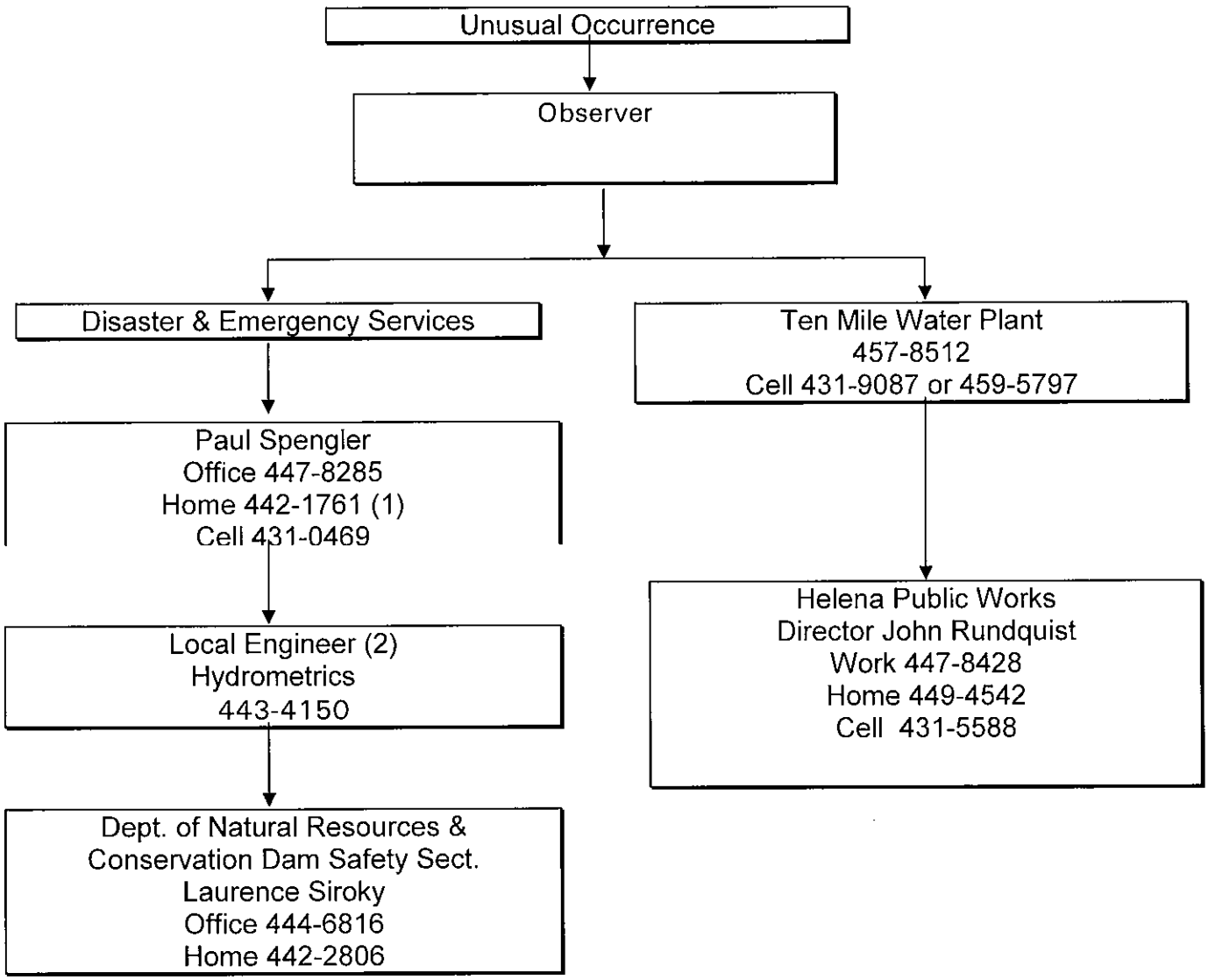
e. Threats of sabotage or occurrence of sabotage of non-critical

project features.

f. Minor earthquake shocks generally felt but not damage causing and less than Magnitude 4.5 on the Richter scale or any quake felt beyond a 50-mile radius from the dam.

1. SCOTT DAM UNUSUAL OCCURRENCE

"NOTIFICATION FLOWCHART"



2. **WHAT THE DIRECTOR/OPERATOR SHOULD DO**. If you discover an unusual condition of the embankment that could threaten the structure:

a. Ten Mile Operator

1. Monitor telephones on a 24-hour basis.
2. Activate appropriate portions of Notification Sub plan and Emergency Operations and Repair Sub plan.
3. Maintain a 24-hour monitoring/surveillance of situation responsible for declaration.
4. Test radio communications.
5. Request assistance from Helena Public Works Director to perform the above.
6. Perform comprehensive examination of seepage (amount, rate of change of flow, and presence of fines) whenever potential problems are observed.
7. Monitor precipitation on hourly basis when significant rains are forecast or occurring.
8. Monitor stream level gages and reservoir level on hourly basis whenever rainfall exceeds 3.0 inches in 24-hour period or less.
9. Examine all areas of embankment hourly if evidence of significant slope failure is found (continue until instructed by Helena Public Works Director to cease).
10. Read piezometers at more frequent intervals.
11. Perform other non-routine observations and tasks as directed by Helena Public Works Director.

b. Helena Public Works Director

1. Monitor telephones on 24-hour basis.
2. Test radio communications.
3. Place key staff on standby for emergency duty.

4. Provide detailed instructions to Ten Mile Operator for any needed non-routine observations and tests.
5. Dispatch personnel to dam site as required to provide expert evaluation of situation and to assist Ten Mile Operator as needed.
6. Activate appropriate portions of Notification Sub plan and Emergency Operations and Repair Sub plan.
7. Notify the county Disaster and Emergency Services Coordinator of the potential problem.
8. Contact the Department of Natural Resources and Conservation Dam Safety Section.
9. When you call an engineer or the director to report a problem, use the form in Appendix A to ensure you provide sufficient information for the engineer. Prepare a sketch showing the extent of the problem, revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take to mitigate problems.

C. **Posting The Notification Flowchart And Distribution Of EAP**.

The notification flowchart is posted at the dam and a copy of the EAP is in the gatehouse. Lewis and Clark County Sheriff's Office, Helena Police Department, and Lewis and Clark County DES Coordinator have copies of the plan.

The Helena Public Works Director shall ensure all pertinent personnel are aware of and familiar with this Sub plan including:

1. Circulation of each updated version for review and signature by all pertinent staff and Ten Mile Operators.
2. Annual review session and training with staff of the Public Works Office and Ten Mile Operators.
3. Within two weeks of assuming duties, briefing of all pertinent staff.
4. Before assumption of duties, briefing of any new Ten Mile Operators or assistant Ten Mile Operators.

D. TELEPHONE DIRECTORY

PRIORITY ONE

1. Sheriff, Lewis and Clark County 911

2. Disaster and Emergency Services

   Lewis and Clark County, Office.....447-8285

   Paul Spengler, Home.....442-1761

   Cell.....431-0469

   Pat McKelvey (Deputy), Office.....447-8225

   Cell.....459-8225

   Home.....443-2253

   Montana Disaster and Emergency Services

   Division, Helena (24 Hour) 841-3911

3. Evacuees Target Notification

   Scott Dam

   3474 Rimini Road 443-5604

   Rich Garrison, 3434 Rimini Road.....443-8539

PRIORITY TWO

4. Local Engineers

   Hydrometrics..... 443-4150

5. Montana Dept. of Natural Resources and Conservation

   Dam Safety Section, Office.....444-0860

   Bureau Chief Laurence Siroky, Home.....442-2806

   Dam Safety Engineers:

   Michell LeMieux (Soils and Embankments), Office.....444-6613

   Chad Newman DNRC Dam Safety, Office.....444-6664

6. National Weather Service

   Helena (Closed-call Great Falls).....443-5151

Great Falls 453-2081

Billings 652-1916

7. City of Helena Staff

Public Works, Office 447-8428

John Rundquist, Public Works Director, Home.....449-4542

Donald Clark, Water/Wastewater Superintendent Home....442-5803

City Manager, Ron Alles, Home.....449-3162

8. U. S. Forest Service 449-5201

Dam Safety Engineer:

Regional Office-Missoula, Steve Romero, Office 329-3351

9. City of Helena Commissioners 447-8410

Mayor Jim Smith, Home.....443-0606

Matt Elsaesser, Home.....431-0815

Dan Ellison, Home 442-7207

Paul Cartwright, Home.....442-6528

Dick Thweatt, Home. 443-3708

10. Lewis & Clark County Commissioners. 447-8304

Michael Murray, Home 443-3197

Derek Brown, Home 698-5927

Andy Hunthausen, Home 443-0287

III. MITIGATING ACTIONS

Besides normal monitoring of the dam's condition which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. The magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety, 444-6816. Actions suggested to mitigate problems that develop should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. Potential Problems and Possible Immediate Response Actions.

1. Overtopping by floodwaters.

   a. Open outlet to its maximum safe capacity (see III D. Reservoir Dewatering)

   b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.

   c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.

   d. Divert flood waters from the reservoir basin by making a controlled breach in a dike section on the backside of the reservoir.

2. Loss of freeboard or dam cross section due to storm wave erosion.

   a. Place additional riprap or sandbags in the damaged areas to prevent further embankment erosion.

   b. Lower water level to an elevation below the damaged area.

3. Slides in the upstream or downstream slope of the embankment (see III E., Earthquake Slope Failure).

   a. Lower the water level at a rate and elevation considered safe given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.

   b. Stabilize slides on the downstream slope by weighting the toe

area with additional soil, rock, or gravel and then restore lost freeboard by placing sandbags at crest.

4. Erosional flows through the embankment, foundation, or abutments.

   a. Plug the flow with whatever material is available (hay bails, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).

   b. Lower the water level until the flow decreases to a non-erosive velocity or stops.

   c. Place a protective sand and gravel filter or boil ring over the exit area to hold materials in place.

5. Failure of appurtenant structures such as outlets or spillways.

   a. Implement temporary measures to protect the damaged structure, such as closing an outlet or providing temporary protection for a damaged spillway.

   b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

6. Mass movement of the dam on its foundation, (spreading or mass sliding failure).

   a. Immediately lower the water level until excessive movement stops.

7. Excessive seepage and high-level saturation of the embankment.

   a. Lower the water level to a safe level.

   b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

8. Spillway back cutting threatening reservoir evacuation.

   a. Reduce the flow over the spillway by fully opening the main outlet.

   b. Provide temporary protection at the point of erosion by placing

sandbags, riprap materials, or plastic sheets weighted with sandbags.

c. When the inflow subsides, lower the water to a safe level.

B. **Emergency Supplies and Resources.** In the vicinity of Scott Dam are soils suitable for emergency repairs. The northeast corner of the reservoir has been used as a borrow area in the past and contains fairly impermeable clay or silty sands. Riprap has been obtained from a source along Ten Mile Creek, an old mine adit approximately 2,000 feet northeast of the dam, and a talus slope one mile southwest of the dam. In addition, the following list includes material, which should be at the site at all times.

Material	Stockpile Location	Minimum Quantity
Riprap	Near right abutment	30 cubic yards (CY)
Gravel	Near right abutment	10 cubic yards (CY)
Sand	Near right Abutment	10 cubic yards (CY)
Sandbags	At Ten Mile Plant or community hall in Rimini	1,000 bags (approx 125 bags per CY)
Clay	Near right abutment	10 cubic yards (CY)

C. **Local Contractors and Equipment.** There is no equipment stored at the Scott Project. The Montana National Guard, City of Helena, and Lewis and Clark County have equipment, which can be brought to the project site in an emergency. Independent loggers operating in the Helena National Forest could be called upon to assist during an emergency (contact can be made through the U. S. Forest Service). **Contractors in the Helena area which could be called upon to provide equipment include the following:**

Helena Sand and Gravel.....442-1185

Montana Powder and Equipment.....442-2990

D. **Dewatering Reservoir.** The 24-inch concrete arch outlet conduit is the primary tool for lowering the water level in the Scott Reservoir. The small size limits the ability to dewater the reservoir. Rapid dewatering, therefore, will not be a problem to the stability of the dam.

The maximum flow capable of being discharged through the outlet is 30 CFS at full reservoir pool. This flow is likely to cause some damage in Ruby Creek but should not disrupt access to the dam. Compared to the storage capacity of the reservoir (1400 acre feet) and the magnitude of the Probable Maximum Flood (5400 CFS inflow), any discharge through the outlet works would be significant. For lesser flooding events, or in the event of an existing or imminent failure of the embankment, the operating gate may be opened as rapidly as possible and while maintaining a check on the safety of the outlet conduit. If during operation the gate binds or discharged water becomes cloudy, release of water from the reservoir should proceed only with extreme caution; cease operation if causes for these conditions are uncertain.

E. **Earthquake Slope Failure.** A major earthquake at Scott could effect the existing embankment's stability. A slope failure may occur as a mass movement of a portion of the earth embankment. This type of failure would seriously weaken the dam and if located high on the embankment, may cause the reservoir to breach the dam.

F. **Sabotage.** All threats of sabotage should be taken seriously. The severe consequences of the dam failure require that actions necessary to maintain the safety of the dam are not compromised. Threats concerning other key project features affecting safety should be reported immediately to the Lewis and Clark County and Jefferson County Sheriff's Department. Immediate assistance to secure and protect the embankment should be requested from the following:

Lewis and Clark County Sheriff's Office	911
Montana State Highway Patrol	841-7000
Montana State Highway Patrol Emergency Number	1-800-525-5555
City of Helena Police Department	911
Federal Bureau of Investigation	443-3617
Federal Bureau of Investigation If No Answer	1-801-579-1400

IV. APPENDIX

Appendix A

Dam Incident Report

APPENDIX A

DAM INCIDENT REPORT FORM

DATE:_____/_____/_____TIME:

NAME OF DAM:

STREAM NAME:

LOCATION:

COUNTY:

OBSERVER:

OBSERVER TELEPHONE:

NATURE OF PROBLEM:

LOCATION OF PROBLEM AREA:_____(looking downstream)

EXTENT OF PROBLEM AREA:

FLOW QUANTITY AND COLOR:_____

WATER LEVEL IN RESERVOIR:_____Feet

WAS SITUATION WORSENING:

EMERGENCY STATUS:

CURRENT WEATHER CONDITIONS: _____

ADDITIONAL COMMENTS:

Appendix B

Site Plan And Road Access

Inundation and Evacuation Maps

Appendix C

Pertinent Data

SCOTT DAM

Location: ..... Township 8 North, Range 5 West, section 2,

Latitude ..... W112 degrees 15'

Longitude ..... N46 degrees 25'

County ..... Lewis and Clark, Montana

Watersheds: ..... Ruby Creek, Ten Mile Creek

Owner/Operator: ..... City of Helena, Montana

Purpose: ..... Municipal Water Supply

Year Constructed: 1952

Dam: ..... Earth-fill dam

Dam Specification: ..... Intermediate size, high downstream hazard

Classification: ..... potential

PERTINENT DATA

REVISED NOVEMBER 2010

SCOTT DAM; MT-1090;

KEY ELEVATIONS: (In feet)

	Project Datum	City Datum
Top of Dam	105	34
Top of Dam Core Wall	105	34
Maximum Operating Pool	99	28
Normal Operating Pool	99	28
Outlet At Toe of Dam	64	--

DAM DIMENSIONS:

Hydraulic Height	41	feet from outlet
Structural Height	61	feet from bottom of core wall
Crest Length	440	feet
Crest Breadth	50	feet
Face Slopes	1V	on 2 1/2H pool side
	1V	on 3H downstream side

INTAKE WORKS:

3 - 20"x20" sluice gate	1 elev. 66
openings:	2 elev. 77
	3 elev. 88

OUTLET WORKS:

Type	Submerged --- inch diameter cast iron (CI) inlet pipe discharging to a --- inch by --- inch concrete arch pipe discharging to a ---inch concrete pipe
Length	110 feet cast iron pipe 88 feet concrete arch pipe 65 feet concrete pipe
Control	Gate valve located in dry-well valve chamber at center of dam.

RESERVOIR:

Surface Area	114 Acres @ normal pool

Storage at:

Top of Dam	2370 Acre feet @ elev. 105 feet

Appendix D

Dam Structures
Scott Dam X-Section

Appendix E

Emergency Evacuation Messages

APPENDIX-E

USE FAST EVACUATION WHEN TIME AVAILABLE IS LESS THAN TWO HOURS

"FAST" EVACUATION:

ATTENTION: THIS IS AN EMERGENCY MESSAGE FROM THE_____DEPARTMENT. LISTEN CAREFULLY. YOUR LIFE MAY DEPEND ON IMMEDIATE ACTION. THE CITY OF HELENA REPORTS THAT SCOTT DAM LOCATED 16 MILES FROM HELENA (is failing, has failed, may fail). REPEAT: SCOTT DAM (is failing, has failed, may fail). IF YOU ARE IN THE AREAS TO BE EVACUATED FOLLOW THESE INSTRUCTIONS.

1. RIMINI RESIDENTS DO NOT MOVE YOUR VEHICLE. ALL ROADS MUST BE KEPT CLEAR FOR EMERGENCY VEHICLES.
2. TWO, RIMINI RESIDENTS WALK TO HIGH GROUND. REPEAT, DO NOT MOVE YOUR VEHICLE.

THE AREAS WHICH MUST BE EVACUATED ARE: THE TOWN OF RIMINI AND TEN MILE CREEK VALLEY RESIDENTS IN THE TEN MILE CREEK FLOOD PLAIN WHICH ARE ALL THE AREAS IN THE HELENA VALLEY AFFECTED DURING THE 1981 FLOOD. REPEAT: THE AREAS WHICH MUST BE EVACUATED ARE - THE TOWN OF RIMINI AND TEN MILE CREEK VALLEY RESIDENTS IN THE TEN MILE CREEK FLOOD PLAIN WHICH ARE ALL THE AREAS IN THE HELENA VALLEY AFFECTED DURING THE 1981 FLOOD. HELENA VALLEY RESIDENTS IN THE FLOOD PLAIN WILL GET A ONE TO THREE FOOT WALL OF WATER WITHIN THE NEXT TWO HOURS. EVACUATE USING THESE ROUTES: IF YOU LIVE IN THE AREA FROM THE RIMINI ROAD AT THE HIGHWAY 12 INTERSECTION TO THE RAILROAD TRACKS BY THE GREEN MEADOW COUNTRY CLUB, THEN GO TO KESSLER SCHOOL AND AWAIT INSTRUCTIONS. COLORADO GULCH RESIDENTS WILL STAY WHERE YOU ARE - YOU ARE NOT IN DANGER. RESIDENTS OF THE HELENA VALLEY BORDERED BY GREEN MEADOW, SIERRA, AND MCHUGH ROADS, WILL TAKE GREEN MEADOW OR MCHUGH TO CAPITAL HIGH SCHOOL OR FOUR GEORGIANS SCHOOL, WHICHEVER IS CLOSER. WAIT THERE FOR INSTRUCTIONS. HELENA VALLEY RESIDENTS IN THE AREA

BORDERED BY MCHUGH, SIERRA, AND MONTANA AVENUE WILL TAKE MCHUGH OR MONTANA AVENUE TO THE FOUR GEORGIANS SCHOOL RESIDENTS IN THE FLOODPLAIN NORTH OF SIERRA ROAD, AND WEST OF INTERSTATE 15 WILL TAKE SIERRA ROAD EAST TO FLOWERREE, THEN FLOWERREE SOUTH TO YORK ROAD, THEN GO EAST TO THE WARREN SCHOOL ON YORK ROAD. STAY THERE FOR FURTHER INSTRUCTIONS. YOU SHOULD BE ABLE TO RETURN TO YOUR HOMES IN SIX HOURS.(REPEAT MESSAGE)

USE SLOW EVACUATION WHEN TIME IS GREATER THAN TWO HOURS

"SLOW" EVACUATION ATTENTION:

THIS IS AN EMERGENCY MESSAGE FROM THE_____DEPARTMENT. LISTEN CAREFULLY; YOUR LIFE MAY DEPEND ON PROPER ACTION. THE CITY OF HELENA REPORTS THAT SEVERE FLOODING IS EXPECTED TO OCCUR IN THE TEN MILE CREEK VALLEY BEGINNING AT - _____(time). REPEAT, THE CITY OF HELENA REPORTS THAT SEVERE FLOODING IS EXPECTED TO OCCUR IN THE TEN MILE VALLEY BEGINNING AT - (time). PLEASE FOLLOW THESE INSTRUCTIONS. ONE, RESIDENTS EVACUATING AFFECTED AREAS SHOULD TAKE WHATEVER VALUABLES THEY CAN MOVE IN THEIR VEHICLE. NO VEHICLES WILL BE PERMITTED TO REENTER OR RETURN TO THE AREA UNTIL FURTHER NOTICE. TWO, PLEASE GO TO THE HIGHWAY 12 INTERSECTION NEAR THE HELENA TEN MILE TREATMENT FACILITY AND WAIT FOR FURTHER INSTRUCTIONS. THE AREAS WHICH MUST BE EVACUATED ARE: THE TOWN OF RIMINI AND UPPER TEN MILE CREEK VALLEY (above Fort Harrison turn off on Highway 12 West) REPEAT: THE AREAS WHICH MUST BE EVACUATED ARE -THE TOWN OF RIMINI AND UPPER TEN MILE CREEK VALLEY (above Fort Harrison turn off on Highway 12 West)

INCLUDE THE HELENA VALLEY RESIDENTS THAT WERE AFFECTED DURING THE 1981 FLOOD ONLY IF THERE IS A CONFIRMED DAM-BREAK. MODIFY THE TIME OF ARRIVAL OF THE FLOOD WAVE USING BEST INFORMATION AVAILABLE.

Appendix F

Modified Mercralli Intensity Scale of 1931 (Abridged)

I. Not felt except by a very few under especially favorable circumstances.

II. Felt only by a few person at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize the motion as an earthquake. Standing motor cars may rock slightly. Vibration similar to that of a passing truck.

IV. During the day, felt indoors by many; felt outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation similar to that of a heavy truck striking building. Standing motor cars rock noticeably.

V. Felt by nearly everyone; many awakened. Some dishes and windows broken; a few instances of cracked plaster, unstable objects overturned. Disturbance of tress, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.

VI. Felt by all; many frightened and run outdoors. Some heavy furniture moved; a few instances of falling plaster or damaged chimneys. Damage slight.

. Everyone runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built, ordinary structures; considerable in poorly built or badly designed structures. Some chimneys broken. Noticed by persons driving motor cars.

VIII. Damage slight in specially designed structures; considerable in ordinary, substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Destruction of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected from ground in small amounts. Changes in well water. Persons driving motor cars disturbed.

IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; damage great in substantial buildings, with partial collapse. Buildings shifted off of foundations. Ground cracked conspicuously. Underground pipes broken.

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Ground badly cracked. Rails bent. Considerable amount of landslides form river banks and steep slopes. Shifted sand and mud. Water splashed over banks.

XI. Few, if any masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII. Damage total. Waves seen on ground surface. Lines of sight and level distorted. Objects thrown upward into the air.

* Note: For an unabridged version of the Modified Marcel Intensity Scale, see Coffman and Stover (1978). See also commentary by Richter (1958).

Appendix G

Operation and Maintenance Plan for Scott Dam

History

1984

Written by:
Morrison-Maierle, Inc

MAY 20, 1991 **Revised by:**
Charles Dickert, Water Superintendent
Leonard Willett, Water Production Supervisor
Michael Oelrich

NOV 6, 1997 **Revised by:**
Jack L. Williams, Water Plant Operator III
Jim Lentz, Water Plant Operator I

JAN 22, 2001 **Revised by:**
Jack L. Williams, Water Production Supervisor
Jim Lentz, Water Plant Operator III

JAN 10, 2002 **Revised by:**
Jack L. Williams, Water Production Supervisor
Doug Hahn, Water Plant Operator II

April 11, 2003 **Revised by:**
HDR Engineering, Missoula MT
Jack L. Williams, Water Production Supervisor
Doug C. Hahn, Water Plant Operator III

History Continued

Feb 11,2005 Revised by:
John Scwhartz, Water Production Supervisor
Doug C. Hahn, Water Plant Operator III

Nov 24, 2010 Revised by:
Jason Fladland, Water Production Supervisor
Craig Hyyppa, Water Plant Operator I